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ABSTRACT

This document contains lesson plans for teaching the left-right relational concept to preschool children. Procedures were designed from a Piagetian framework, so that cognitive conflict was considered a necessary condition for the evolution of transpositional skills. Conflicting viewpoints were instituted through teacher initiated peer interactions and the use of testing materials designed to provide self correcting, and often discrepant feedback. The document lists materials needed for the lesson and actual training procedures, presented in a session by session format. (DP)

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TRAINING PRESCHOOLERS TO UNDERSTAND LEFT-RIGHT RELATIONS: LESSON PLANS

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The following lesson plans were designed to train preschool aged children to understand the concept of left-right relational skills. According to Piaget (1928) there appear to be three global levels in the development of left-right transpositional skills: (a) In the first stage the child defines left and right concepts using his own body as the sole frame of reference; (b) at the second level, he is able to correctly identify the lefts and rights of other persons, and can deal with the left-right relationship between two objects, and (c) by the third stage, the child has a completly abstract conception of these relational terms.

Since a Piagetian framework of left-right relational development was taken, the training procedure utilized Piaget's (1926) suggestion that cognitive conflict, or the presentation of conflicting points of view, is a necessary condition for the evolution of transpositional skills Thus, in natural group settings, conflicting viewpoints were instituted through teacher-iritiated peer interaction and through the use of testing materials which were designed to provide self-correcting and often discrepant feedback.

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The results of the effectiveness of the lesson plans have been reported elsewhere (Wilmhurst & Rubin, 1973). Briefly, significant post test differences on a measure of left-right relational skills

were found between an experimental group which received the lesson plans and a control group which did not (Pretest performance between the groups was non significant). The lesson plans are described below:

I. Materials Required for the Training of Left-Right Relations

The training of left-right relations consisted of 10 sessions distributed over 7, 30 minute sessions. The stimulus materials required for each lesson were:

Lesson 1-2/3 the Language Master (Bell and Howell) was used by the experimenter to introduce concepts such as same and different and to illustrate how these initial discriminations applied to the relational concepts of left and right. The Language Master is a sound recording machine, operable by either a child working independently or by the instructor, which uses magnetic tape cards (8"x10½"). Sounds may be recorded and played back on cards, each of which is equipped with two channels of magnetic type across the bottom. Space at the top of each card permitted the graphic portrayal of a concept and corresponding sound recording of the concept. Thus the child was able to see and hear the concept simultaneously. For example, two identical squares were drawn on one card such that the same half of each square was red and the

remaining half, white. The corresponding statement recorded was: "The squares are the same." Ten cards were constructed for each of lessons 1, 2 and 3.

Lesson 4-5 - a felt board (2'x3') that was self supporting and cutouts of a boy and girl (1'x4") which depicted a front or back view, as well as left and right profile, indicated separate relational viewpoints. Proportionately scaled cutouts of a dog, cat, bird, tree, house, ball, table, cup, plate, knife, fork, and glass were also constructed of felt.

Lesson 6-7 - four cutout puzzles. The puzzles were constructed by placing a cardboard overlay (2'x3') over top of the felt board. The puzzles depicted a boy and a girl, either facing or with their backs to the subjects. Cutouts of a left hand, left foot, right hand and right foot (labled with the appropriate letters, L and R) were constructed of felt, such that they could be inserted into the proper frame of the puzzle.

Lesson 8 - a five-finger puppet (a brown dog with two moveable arms and legs, 9"x5").

Lesson 10 - two sets of five pictures each constructed of felt and the felt board used previously. The first set of pictures included (2 of each of) an apple, star, bird, house, dress. The second set was comprised of (2 of each of) a flower, ball, shovel, banana and boat. Each picture was approximately 6"x4" and

duplicated pictures were identical. In addition, 7 (8"x10") cards were constructed to illustrate various person and object interrelationships.

II. Training for Relational Judgment (Left and Right)

The Ss in the training group were subdivided into two subgroups: E_1 which consisted of 5 Ss (3 females, 2 males) and E_2 comprised of 3 Ss (1 female, 2 males). The training groups met four times the first week, and three sessions the following week. Each of the seven training sessions was of 30 minute duration and each subgroup (E_1 and E_2) received the session the same time each day (E_1 participated in the session from 10-10:30; E_2 received the session from 10:30-11:00). Each session was comprised of two interrelated lessons, with the exception of sessions 1, 5 and 6 which contained one half hour lesson. Since the lessons were grouped in this fashion, a review period was not necessary at the onset of each new session. The same underlying concepts (left and right) were therefore presented with new materials each session, and each session served as its own review while at the same time advancing the progression of difficulty.

Throughout the training session, the E initiated questions in an attempt to guide, rather than instruct the Ss concerning solutions to various problems. The E provided correct answers when a new concept was introduced or when the Ss in their search for the correct solution deviated from the concept to the extent that otherSs became confused e.g., some of the Ss seemed more

concerned with the buttons on the Language Master than the lesson per se and generated too many questions about the machine or refused to answer unless they could play with it. At all times, the E attempted to direct the Ss attention to the lesson proper and maintain this attention by asking the Ss to correct and point out the mistakes of the other Ss. When an S responded correctly, the E asked why the S gave that particular response in an attempt to clarify S's understanding of the concepts. If an S was incorrect, the E also asked why the S gave that response in an attempt to allow the other Ss to see the conflict. It was assumed that conflicting responses would initiate a better understanding of the concepts presented.

The Ss were provided with name tags at the initial meeting which were collected after the first session and eliminated after the second session. The E began the first session by introducing all the Ss to each other and introducing herself to the Ss. When the introduction was completed, the E said; "We are going to play some games together for a while. I would like you to give answers to as many questions as you can. Raise your hand if you know an answer and I will ask you. You may have to wait your turn if more than one hand is raised, so that everyone has a chance to play all the games. When you are not playing a game, please

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watch what the other children do when they play. It will help you to play the game better when you know an answer. I would like you all to play as many games as you can."

Session 1

Lesson #1 (Same and Different)

In order to teach the child such relational concepts as left and right, the E began the lessons with elementary discriminations of same and different. Starting with more global representations of same and different, the lessons progressed to include more finite discriminations specifically refering to same or different sides. Initially, discriminations pertaining to left and right were refered to as "this side" indicating the left and "that side" indicating the right.

"Now we are going to play our first game. I would like you to sit on the floor like this. (The E arranged the Ss such that they were in a semi-circle on the floor. This seating arrangement was adhered to for the remaining lessons, unless otherwise specified.) Is everyone comfortable? That's good." (The E waited until all the children were settled and relatively quiet and then brought out the stimulus materials.)

The E described the Language Master which was on a table (approx. 3') situated at the centre of the semi-circle about 3 feet from the Ss. "This is a machine that can talk. Watch what happens when I put the card into the machine. (The E inserted the first card for the lesson into the Language Master. The card depicted two squares. The squares (3"x3") were colored such that one half of each square was red and one half was blue.

A vertical line separated the two colors. The left half of each square was red and the right half was blue. The squares were separated by a 2" space.) The statement which the Language Master provided was: "The squares are...(pause)..the same." The initial card was stopped before the completion of the sentence only for a few seconds to insure that the Ss heard the sentence as an entity. The E then inserted the card again, this time allowing the full pause (allowing Ss an opportunity to respond) before the sentence was completed. "Let's listen to the machine again." For a second time, the initial part of the statement was heard: "The squares are..." at which time the E shut off the machine. The E waited for about five seconds and if the Ss did not respond simultaneously, the E said; "Can anyone tell me?" If there was no response, the E prompted the Ss by saying; "what can you tell me about these squares?" If a response was given, the E asked the remaining Ss if they agreed and why. If there was no response, or if there was a controversy among the Ss as to the correct answer, or if all responses had been given, the E said; "Let's find out." The machine was turned on and the remainder of the statement.. "the same" was heard by the Ss. The E re-inserted the same card once again and as she placed it into the machine said; "let's listen to what the machine says. If you know an answer raise your hand and I will ask each one of you in turn." The card was again presented to the Ss and the first part of the sentence was heard. The E waited for the Ss to raise their hands and proceeded to ask each S for his response. The E questioned the S as to why

he chose his answer and asked the remaining Ss if they agreed or disagreed and why. If the Ss provided the same answer to why the squares were the same, the E asked if there were any other ways that the squares were the same. The E repeated this procedure for all Ss who provided responses. After all responses had been given, the E said; "Let's find out." and the statement was completed. The E inserted the card one more time and played the sentence in its entirety.

After the fourth presentation of the card, the E initiated questions about the card to help the children understand what was the same about the squares. The E said; "What colours are the same?" If the Ss did not respond with both colours, then the E also said; " "What other colours are the same? Why are they the the same?" (After each question, the E waited for the Ss to answer spontaneously.) If no answers were given, the E prompted saying; "Can anyone name the colors on the square? (E pointed to the red) What is this color? What is this color? (blue)". The E repeated for the second square. The E then pointed to the left side of the first square saying; "what can you tell me about this side of this square? What else can you tell me about this side? Can anyone tell me what the red sides are? Why are they the same? Does everyone agree? The E repeated the questions for blue. The E initiated questions to indicate that red was not the square but only part of the square, if such a response was given, The E repeated the card a final time before introducing the next card; ""The squares are the..(pause) same."

"Now we will look at another card." The E revealed the

second card in the first series. The card displayed two identical dogs. The dogs were both brown with a red ribbon around their necks. The E placed the card into the Language Master saying; "Let's see what the machine can tell us about the dogs." The card advances slowly across the machine; "The dogs are..(pause) the same." The machine was stopped and the E waited for the Ss to respond. The E asked that each S raise his hand before he answered. The E asked each S for his response.

The E attended to the Ss' individual responses to estimate whether or not the Ss were beginning to grasp the concept of same. If the Ss deviated from the concept same, in their responses, the E said; "That is true, but what else can you tell me about the dogs."

In response to the partial statement initiated by the second card, the E again attempted to have the Ss respond, if they did not do so spontaneously, by saying; "Can you tell me?" If there were no responses or the responses were completed, the E said; "Let's find out." The card advanced to complete the statement. The same procedure was followed for all subsequent cards. Each card was repeated four times. The initial presentation served to introduce the concept. The second presentation gave the Ss an opportunity to respond to the partial statement while allowing them to hear the responses of other Ss. The third presentation served to further integrate the pictures on the card with the defining statement by requiring that the Ss substantiate their responses such that Ss stated why the response they had chosen was applicable. The third presentation also

provided an additional opportunity for Ss to hear conflicting responses and supporting statements, which were offered by other Ss. The fourth presentation of the card provided an opportunity to hear the statement in its entirety.

Following the fourth presentation of each card, the E initiated questions concerning the card. The questions were aimed at guiding the Ss to a better understanding of what elements on the card were the same. With the completion of the E initiated questions, the card was presented a final time, allowing only a slight pause (3 sec.) between parts of the sentence, to integrate the specific questions with the concept for the pictures in general.

Experimenter initiated questions for the second card were: "What color is this dog (left)? What color is that dog (right)? The colors of the dogs are the..(response) same. Why are the colors the same? What is this dog wearing? What is that dog wearing? The dogs are wearing ribbons that are..(response)..the same. Why are the ribbons the same? (look alike, same color) Why else are the ribbons the same? The dogs are..(response) the same. Why are the dogs the same? What else about the dogs is the same? Can you think of anything else that is the same about the dogs?" The E continued until the Ss established that the dogs were both the same because, they were brown, looked alike and were wearing red ribbons that were the same and looked alike. The E then placed the card into the machine for a final time and the sentence was heard; "The dogs are the ..same."

The E repeated the procedure for the next three cards:

two identical houses (yellow houses, with a red chimney on the right hand side with a door on the left side); two identical yellow stars; two identical cups with a red flower painted in the middle and handles turned to the right side. For each card the E presented it four times in the same procedure as previously stated. Following the fourth presentation, the E initiated similar questions to those mentioned previously. The final presentation of the card (fifth hearing) was the same.

The fifth card was presented in the same manner as the first card and depicted two squares, one red and one green. The card provided the statement; "The squares are..different." (The terms not the same and different were used interchangeably to familiarize the Ss with both forms of the concept.) The procedure was the same as for the first card that introduced the concept same.

The sixth, seventh and eighth cards depicted: the two dogs used previously, one with a red ribbon and one with a yellow ribbon; two squares, one with the left side red and the right side of the other blue; two houses, the house on the left with a window and the house on the right with no window, and a chimney on the right side of the left house which was on the left side of the right house. The presentation of the cards (4 times) and the E initiated questions followed the same procedure as outlined above. The differences attributed to left side and right side were refered to at this stage as "this side" and "that side" respectively. For example, the questions concerning the dogs were presented in the following manner: "What

color is this dog (E pointed to the dog on the left)? What color is the dog on that side? What can you tell me about the colors of both dogs? Why are they the same? What color is the ribbon on this dog? What color is the ribbon on that dog? What can you tell me about the ribbons the dogs are wearing? What else can you tell me about the ribbons that the dogs are wearing? What else can you tell me about the ribbons? Why are they not the same? Are the dogs the same? Why? Are the dogs different? Why? The dogs are...(response) not the same. Why?

The last two cards in the series were the most difficult, since they provided identical objects that had a difference in position of color etc. The ninth card displayed two squares, one with red on the left and green on the right and one with red on the left and blue on the right. An arrow pointed to the left side of each square. The card when inserted stated; "The colors on this side of the squares are the...(pause).. same. (The arrow indicated the left side of both squares.) The tenth card displayed the same pictures, but with no arrow. The card when inserted into the Language Master stated; "The squares are.. ..(pause) not the same." The final two cards were presented according to the procedure outlined above.

The E thanked the Ss at the end of the session and collected the name tags. At the end of each session, the E continued to tell the Ss that they all played the game very well and that she was looking forward to seeing them the next day.

Session 2

Lesson #2 (Same and Different; Left and Right)

The E provided a brief warm up by saying; "Hello everyone. How are you today? Here are your name tags. I will put your name tags on." (The E placed the tags on each S.) If the Ss attempted to make conversation with the E, the E said; "I can't stay with you very long today, so let's start playing the games now." The E seated the Ss and said; "Is everyone ready? Then let's begin." (Throughout the lessons, the E always waited until the children were ready before beginning.)

"Remember the talking machine? Well, let's see what the machine has to say today." (The E exposed the first card.) "Let's see what the machine says about this card." The card had two circles on it. The circle on the left side was red and the circle on the right side was blue. There was an arrow pointing to the red circle. The card when inserted stated; "The red circle is on the..(pause) left hand side." The E followed the same procedure with the first card in this series as previously outlined in lesson #1, for the first card of every new concept. The E induced questions (as previously) followed the fourth presentation of the card, e.g., "The circle that is red is on the left hand side. The left circle is..red. The arrow is pointing to the circle on the..left hand side. The circle on the left hand side is..red."

The second card depicted a bird (left) and a dog (right). The bird was yellow and the dog was brown. An arrow pointed to the bird. The card stated; "The bird is on the..left hand side. The third card was the same as the first with the exception that

the arrow was pointing to the blue circle. The card stated; "The blue circle is on the..right hand side." The E followed the procedure for the introduction of a new concept.

The fourth card was the same as the second with the arrow pointing to the dog. When placed into the machine the card provided the statement; "The dog is on the..right hand side." The E followed the procedure outlined above.

The fifth, sixth and seventh cards indicated: a tree (left) and a house (right); a star (left) and an apple (right); a duck (left) and a pond (right). The cards provided the following statements about the pictures indicated above: "The tree is on the..left hand side."; "The apple is on the.. right hand side."; "The duck is on the..left hand side." After playing the cards for the fourth time, the E initiated questions concerning the left and right objects on each card. For example, after the fifth card was heard for the fourth time, the E said; "The house is on the..right hand side. The picture that is on the left hand side is the..tree. The picture that is on the right hand side is..the house, etc."

The last three cards combined the concepts same and not same with left and right. The eighth card revealed a square that was red on one half and yellow on the other. When the E inserted the card into the machine, the following statement was heard; "The color red is on the..left hand side." As with previous cards, the E followed the same procedure, playing the card four times. The E induced questions attempted to

guide the Ss to incorporate the concepts of same and different with left and right. The E asked the following questions; "The left side of the square is..red. The color yellow is on the..right hand side. The colors on the square are..different (not the same). Why are the colors different? Why is the left side of the square different from the right side?"

The ninth card displayed two squares, one square on the left side of the card and one square on the right side of the card. The left sides of both squares were red. The right side of the left square was blue. The card inserted into the machine stated; "The colors that are the same are on the..left hand side." Since this was one of the more complex questions, the E initiated questions were more numerous than for the previous cards. It was also assumed that previous exposure to the square on the left (same square used in the eighth card) would aid in the transition to the more complex level of understanding. Before playing the card, the E described the card for the Ss. "Look at this card. See, on the card are two squares. Remember this square (the E pointed to the square on the left)? It was on the last card that you saw. Tell me what you can remember about this square. What color is on the right hand side? What color is on the left hand side?" The E inserted the card into the machine and the statement was heard by the Ss; "The colors that are the same are on the..left hand side." After the fourth presentation of the card, the E initiated the following questions in an attempt to guide the Ss to an integration of the picture parts into meaningful relationships: "The square on

the right is..red and blue. The square on the left is yellow and red. The colors on the left side of both squares are.. red and red. The colors on the right sides of both squares are..blue and yellow. The colors that are the same are.. red and red. The colors that are different are..yellow and blue. The color blue is on the right hand side. The color red is on the left hand side. The right hand sides of both squares are..not the same. Why? The left hand sides of both squares are..the same. Why?

The tenth card revealed four circles, such that two blue circles were on the right side of the card and a red and green circle were on the left side of the card. The card when inserted into the machine stated; "The circles that are different are on the..left hand side." After the Ss heard the statement for the fourth time, the E initiated the following questions; "The circles on the left hand side are..red and green. The circles that are different are on..the left hand side. Why? The circles that are the same are on..the right hand side. Why are they the same? The colors of the circles on the right are blue. The red circle is on the..left hand side. The blue circle is on the..left hand side."

Lesson #3 (People and body parts - left and right)

The Language Master also provided the basis for the third lesson. "Here is a new card. See, there is a picture of a boy on the card. The boy is sitting at a desk. His hand is up because he is asking the teacher a question. Let's put the card into the machine and see what the card says about

the boy." (The E inserted the card into the machine. The picture of the boy presented the boy such that his back was towards the Ss.) The card stated; "The hand that is up is the ..right hand." When the E played the card four times and asked the Ss a few questions, the second card in that series was introduced.

"Here is another card. See, it is a picture of the boy again. The boy has his hand up too (also back view). Let's see what the card has to say about the boy." The E played the card, following the procedure outlined previously and the card stated; "The hand that is up is the..left hand."

The third card depicted a baby holding a rattle in his left hand, the right hand was on the floor supporting him. Once again the baby was drawn such that his back was to the Ss. The card when inserted into the machine stated; "The hand holding the rattle is the..left hand." The fourth card had an illustration of a school guard holding a stop sign in his right hand. The school guard had his back to the Ss. The card provided the statement; "The hand holding the stop sign is the..right hand. The fifth card revealed a mother and a little girl. The mother and child had their backs to the Ss. The mother was holding the little girl's left hand with her right hand. The card when inserted stated; "The mother is holding the little girl's..left hand." Since the fifth card revealed a two person interaction, the sixth card also revealed the same picture with the little girl on the left and the mother on the right. The fifth card stated; "The little girl is

holding her mother's..left hand." The E initiated questions increased as the complexity of the illustrations on the cards increased. The E initiated questions for the fourth and fifth cards concerned both people (mother and girl) and attempted to reveal the implications of a side by side (back view) relationship.

The next three cards depicted one boy in three positions. The boy was holding a flag in his left hand. The first position depicted the boy with his back to the Ss, holding the flag in his left hand. The middle picture revealed a profile of the boy such that the hand holding the flag (left) was towards the back of the card, while the right hand was closest to the Ss. In addition to the flag in the left hand, all pictures also illustrated a book in the boy's right hand. The picture on the right showed the boy facing the Ss with the flag in his left hand. The boy was illustrated as walking along a continuous sidewalk, so that the sidewalk progressed through all three pictures and the boy's journey was seen to progress through all three pictures. The sidewalk turned to reveal a different direction in each picture. The E introduced the seventh, eighth and ninth cards at the same time. The E provided a replica of all three pictures and presented them at the same time on one piece of cardboard (8"x30") which she held in front of her and described to the Ss. "Here is a picture of a boy. All three pictures are of the same boy. The boy is walking to school with a flag in his hand. The path that the boy takes to school, first goes up here (E outlined the path with her finger, for each

picture) then across like this, and then down like this, until he reaches the school which is here (The E points to the school located at the bottom of the final segment).

The E placed the 7th card into the machine. "Here is a card that has a picture of the boy on it. See this picture shows the boy as he is walking up this path (pointed). See, this picture is the same as this part of the big picture. Let's see what the machine says about the boy." The card was inserted into the machine and stated; "The boy is carrying the flag in his.. left hand." The E completed the procedure for the 7th card for four repetitions of the statement. The E initiated questions were; "The boy's left hand is holding a..flag. The boy is holding the book in his..right hand. The hand that is up is the.. left hand. etc."

The E revealed the 8th picture which corresponded to the middle position on the large replica. "Here is the boy again; now he is walking along the path. This card has the same picture on it as this part of the boy's trip. Let's see what the machine says about the boy walking to school." The card was inserted into the machine. The statement that the card provided was; "The boy is carrying the book in his..right hand." After the fourth placement of the card, the E asked; "In his right hand, the boy is carrying..a book. In his left hand, the boy is carrying a .. flag. The boy is carrying the book in his..right hand. The boy is carrying the flag in his.. left hand."

The 9th card was provided in the same manner as the 7th

and 8th. The 9th card corresponded to the final segment of the replica, depicting the boy facing the Ss. When placed into the machine, the card stated; "The boy is carrying the book in his.. right hand." Once the card had been repeated four times, the E asked questions pertaining to the card as previously done.

The E then initiated questions refering to the large replica card which showed all three positions: "The boy carries the flag in his..left hand. The hand that carries the flag is the same in all pictures. Why is the hand that carries the flag the same? The boy's left hand is always on his..left hand side. In the middle picture, the boy's hand that is up is his.. left hand. In the last picture, the boy's left hand and your left hand are on..different sides. Why? In the first picture, the boy's left hand and your left hand are on the..same sides. Why? Come to the picture and stand the same way that the boy is standing (pointed to the first, back view). Raise your hand that would hold the flag, so that it will be the same hand as the picture shows. Is __ standing the same as the boy in the picture? Why? Is the hand that is raised, the same hand as the boy's in the picture? Why? The hand that is raised is the.. left hand. Is ___'s left hand on the same side as your left hand? Why? (Last 8 questions were directed at all Ss concerned with imitating the boy in the picture) The E repeated this procedure for each of the segments, such that an S modeled the boy's position for the remaining two segments and similar questions were asked concerning both the picture and the S.

The E then posed additional questions concerning the three

pictures to emphasize position-determined left and right relationships.

The tenth card illustrated a boy with his back to the Ss and a girl standing to the right of the boy with her front facing the Ss. The boy was holding an ice cream cone in his left hand. The girl was holding a doll in her right hand. The E inserted the card into the machine and described the picture for the Ss: "Here is a picture of a boy (pointed) and a girl (pointed). The boy is standing with his back to you. The girl is facing you. The boy has an ice cream cone in one hand. The girl has a doll in one hand. The card when inserted stated; "The girl is holding the doll in her..right hand." After the card had been played four times, the E switched to the second track of the tape: "Now let's see what the card says about the boy." The card stated: "The boy is holding an ice cream cone in his..left hand." After the fourth presentation of the second statement of card ten, the E initiated the following questions; "The doll is in the girl's..right hand. The ice cream cone is in the boy's..left hand. The boy and girl are standing..different. The boy's left hand is on your..left hand side. The boy's right hand is on your..right hand side. Why is the boy's right hand on the same side as your right hand? Why is the boy's right hand on a different side than the girl's right hand? Why is your right hand on a different side then the girl's right hand? Why is the boy's right hand side different than the girl's right hand side. Show me the boy's right hand. Show me the girl's right hand. Show me the boy's left hand.

Show me the girl's left hand.

The E thanked the Ss for playing the game.

Session 3

Lesson #4 (Objects to the left or right of persons)

The E welcomed the Ss and began the lesson as soon as the Ss were settled. "Today we are going to play a new game. See this big board (the E pointed to the felt board which was on a table directly in front of the Ss). It is called a felt board, because it is made out of a material called felt. I have some pictures made out of felt too. The pictures will stick on the board. Here is a picture of a boy standing with his back to you. Here is a picture of a boy facing you and here is a picture of a boy standing sideways. All three pictures are of the same boy. The boy is just standing different in each picture. Here are three pictures of the same girl. See, here she is standing with her back to you. Here she is standing sideways and here, she is facing you. (The E placed the pictures on the board as she described them. The E removed the pictures and replaced them with the new items that she revealed to the Ss.) Here is a dog and a cat. Here is a bird. This is a house. Here is a tree. Here are pictures of a ball and a table. I also have pictures of a cup, a plate, a fork, a knife and a glass." (The E removed all the stimulus items.)

"Now I will put the picture of the boy here. (The E placed the picture of the boy with his back to the Ss in the middle of the felt board.) Now I would like you to put some pictures on the board for me. Who would like to try? You

were first, so would you like to come to the board, please, Here is a picture of a dog. Put the dog on the board so that it is on the same side as the boy's left hand. How many think that the dog is on the same side as the boy's left hand? Why? How many think that the dog is on the same side as the boy's left hand? Why? (If the majority of Ss were incorrect, the E asked more specific questions to direct the resporses towards the more difficult concepts, e.g., "Show me the boy's left hand. Show me the side of the board that is the same as the boy's left side, etc." At all times, if the Ss did not understand a relationship, the E reverted to asking questions about the individual parts, working up to the desired question. If however, the Ss were able to answer the questions, such that at least half the Ss revealed an understanding of what was involved, the E continued at the present level and increased the questions involved after each placement. This allowed those Ss who had not quite grasped the question an opportunity to have more exposure to the relationships involved. The E repeated the procedure for the next item and asked for another S to come to the board.

The next item was a picture of a bird. The E addressed the Ss saying; "Here is a picture of a bird. Who wants to come to the board? Good. I would like you to put the picture of the bird on the same side as the boy's right hand." The E asked the remaining Ss if they agreed or disagreed and why, as in the above procedure.

The E asked the following questions concerning the

three pictures on the board (dog, boy, bird): "The dog is on the..left hand side. The bird is on the..right hand side. The dog is on the boy's..left hand side. The bird is on the boy's..right hand side."

The E repeated the procedure for the picture of the cat which was placed on the "same side as the boy's right hand." The E initiated questions concerning all the pictures on the board and their relationship to the boy. The E continued the same procedure for the picture of the house which was placed on the "same side as the boy's left hand". The E initiated questions concerning all the items.

The E removed the pictures from the felt board and replaced the picture of the boy (back view) with a picture of a girl facing the Ss. The girl was placed in the centre of the board. The E asked the Ss to individually place pictures of the bird, tree, ball and dog on the felt board such that the bird and ball were on the "same side as the girl's left hand", and the tree and dog were on the "same side as the girl's right hand." The format was identical to that stated above. After each placement the E asked the other Ss if they agreed or disagreed and why. Questions pertaining to the items placed followed each individual placement and cumulatively included all relationships. The final questions concerning all four pictures were: "The bird and the ball are on..the girl's left hand side. Why? The tree and the dog are on the girl's right hand side. Why? The E then asked questions for each of the objects concerning their placement.

The E removed the pictures. "Here is a picture of a girl with her back to you. Who can place this picture on the left side of the board? Is the picture on the left side of the board? Why? Here is the picture of a boy facing you. Who can place the picture on the right side of the board? Is the picture on the right side of the board? Why?" The E initiated questions as follows: "The boy is on the..right hand side. The girl is on the..left hand side. Who can point to the boy's left hand? Is that the boy's left hand? Why? Who can point to the girl's left hand? Is that the girl's left hand? Why? etc."

The E removed the pictures. (The E tryed to ask as many different Ss as possible to place the pictures.) "Here is a picture of a girl with her back to you. Who can place this picture on the left side of the board? Is the picture on the left side of the board? Why? Here is a picture of a boy facing you. Who can place the picture on the right side of the board? Is the picture on the right side of the board? Why?" (The E then asked Ss to point to the left and right hands of the pictured boy and girl with other Ss affirming or correcting if incorrect.) "Who would like to place the ball on the same side as the boy's right hand? Why?" The E repeated the procedure for placements of the dog which was on "the same side as the girl's right hand". Once the placements had been completed, the E asked the following questions: "The ball is on the same side as the girl's..right hand. The ball is on the same side as the boy's right hand. Why? The dog is on the same side as the boy's..right hand. The dog is on the same side as the girl's..

right hand. Why?

The E removed the stimulus materials and began the next lesson immediately.

Lesson #5 (Objects to the left or right of objects)

Since the concepts and underlying relationships were becoming increasingly more difficult, the initial part of the new lesson slowly integrated material previously learned with new material.

The E placed the picture of the boy with his back to the Ss on the felt board. "Here is a boy. He is standing with his back to you. Here is a dog. (The E placed the dog to the left of the boy.) The dog is standing beside the boy. The dog is on the boy's..left hand side. The boy's hand that is touching the dog is his ..left hand. Here is a picture of a bird. (The E placed the bird on the boy's right.) The bird is flying beside the boy. The bird is on the boy's..right hand side. The bird and the dog are not..on the same side."

"Now we are going to put some more pictures on the board. Who can put the tree on the same side as the picture of the bird? (The E adjusted the pictures of the bird, dog and tree such that the tree was to the right of the bird.) The E removed the picture of the boy, and initiated the following questions: "The dog is to the left of the..bird. Why? What else is the dog to the left of? Why? The tree is to the right of the..dog. Why? What else is the tree to the right of? Why? On the left side of the bird there is a .. dog. On the right

side of the bird, there is a .. tree. What is to the left of the bird? Why? What is to the right of the bird? Why?

Who can move the bird? I would like you to put the picture of the bird to the right of the tree. Is the bird to the right of the tree now? Why? Now, who can move the bird to the left of the dog? Is the bird to the left of the dog? Why?" The E initiated questions similar to those used previously concerning the final placement of pictures and their relationships to each other.

The E then removed the pictures and set up the felt board such that the girl had her back to the Ss and the boy was facing the Ss. There was a table between the pictures of the boy and girl. "Here is a picture of a boy and girl sitting at a table. They are going to eat their lunch. Here is a fork. Who would like to put the fork on the girl's right hand? Is the fork in the girl's right hand? Why? Who would like to put the knife in the girl's left hand? Is the knife in the girl's left hand? (The E repeated the procedure until the cup was at the boy's left hand and the glass was at the boy's right hand.)

"Who would like to try next? Take the fork from the girl's right hand and put it in the boy's right hand." (After each placement, the E asked all the Ss if the placement was correct and why.) The remaining Ss were asked to take the knife from the girl's left hand and put it beside the boy's left hand; take the glass from the boy's right and put it at the girl's right and take the cup from the boy's left and put it beside

the girl's left hand.

Once all the placements had been made and corrected, the E initiated questions concerning the relationship of the objects to the person and objects to each other.

The E thanked the Ss and said that she was looking forward to seeing them soon.

Session 4

Lesson #6 (Puzzle of left and right)

The E welcomed the Ss and began the new lesson. "Here is a puzzle. See, it is a picture of a boy. The boy has his back to you. His hands and feet have been cut out so that they come off the puzzle. (The E removed the puzzle parts.) Here are the hands and feet. I will give you a hand or foot and tell you if it is the left or right one. When I tell you that you have the left foot, go to the puzzle and put the foot on the boy's left leg. If the foot fits, then you have chosen the correct side. You have to put the foot on the left leg. But if the foot does not fit where you have put it, you have chosen the wrong side. If I give you the right foot, it will only fit on the right side. Who would like to try the puzzle first?"

"Here is a hand. On the hand is a big letter R. The R stands for right. I would like you to put the hand on the boy's right arm. See, if it fits in the puzzle place you have chosen then you are correct." The E said; "Good, the puzzle fits. You have put the boy's right hand on correctly." If the choice was incorrect, the S was not able to fit the hand into the

puzzle space. The E said; "Does the puzzle fit? Can anyone show me where the puzzle part should go so that the boy's right hand is on correctly?" (The E asked the S in each case why the puzzle did or did not fit.)

The procedure was repeated for the next seven placements of the puzzle parts. After all four parts (left and right hand, left and right foot) had been placed on the puzzle correctly (the E had the part removed after each placement), the E repeated the procedure again giving the last Ss an opportunity to place the same puzzle parts as the first Ss.

The E then introduced a puzzle of a boy facing the Ss. "Here is a picture of a boy. It is a puzzle. The boy is facing you. There are spaces for his hands and feet. I will give you a part to put on the puzzle. If you put the part in the correct place, the puzzle piece will fit. If you have not picked the correct place, the puzzle piece will not fit."

The E repeated the above procedure for all four body parts through two completed puzzles. All Ss were given the opportunity to place one of the body parts on the second puzzle.

Lesson #7 (Puzzles - contrasting positions)

The E presented the new puzzle (18"x14") of a girl with her back to the Ss. "Here is a girl. She is standing with her back to you. Here is a picture of a boy. (The E placed the second small puzzle to the right of the first.) The boy is standing to the..right of the girl. The boy is standing with his..face to you. I will give you some parts to fit in

the girl puzzle and the boy puzzle. If the puzzle parts fit you have chosen the correct place. If the parts do not fit you have chosen the wrong place. Who would like to try? (The E assigned one S to the left puzzle and one to the right puzzle, simultaneously.) I will give you both a hand with the letter R on it. That is the..right hand. The hands are both..blue. I would like you (S_1) to put the girl's right hand on. I would like you (S_2) to put the boy's right hand on. If the puzzle fits you have chosen the correct hand. Is the boy's right hand in the correct place? Why? Is the girl's right hand in the correct place? Why?

After the placements had been made correctly, the E asked questions pertaining to the puzzle as far as it had been completed at each step. The E did not remove any puzzle parts. All questions were cumulative. Once all the corresponding parts were in place, the E asked questions pertaining to all puzzle parts. Since the right hands were blue, the left, red, the right feet, yellow and the left feet green, the E initiated questions such as; "The hands that are blue are the..right hands."

The E repeated the procedure with two exceptions. The Ss who previously placed parts on the puzzle of the girl, were asked to place parts for the boy puzzle, and the parts of the body were different colors. For example, the right hand for the boy was now blue while for the girl it was red. The left hand for the boy was red and for the girl was blue. The questions at the end of the placements, therefore were more extensive; "The boy's red hand is his..left hand. The girl's red

hand is her..right hand. The right hands are..red and blue, etc."

The E thanked the Ss.

Session 5

Lesson 8 (Left and Right as relational concepts)

The E welcomed the Ss. The E sat at a low table such that she was facing the Ss who were sitting on the floor. The E introduced the puppet to the Ss. (The voice of the puppet was also provided by the E.) The E was sitting at the table such that the puppet was sitting on top of the table with a dog house. The E's arm extended through the dog house such that the dog could be viewed just outside the doorway. "Here is someone I want you to meet. This is Silly. Silly is a puppy. Silly thinks he is the most important thing in the world."

Puppet (P): "I am so beautiful. I am so smart."

E: "All right Silly, if you are so smart, then you can answer some questions for us. The boys and girls have been playing some games. They have been playing with left and right. Can you show me your right hand?"

P: "That is going to be easy. I am so smart. Let's see now. I can only pick one hand, they can't both be right can they?

E: No Silly. Now I know why they call you Silly. You have a left hand and a right hand. Can you show me your right hand?

P: Well, um, let's see now. Everyone has a left hand and a right hand. Then that means that everyone is just like

me.

E: I think it would be better, Silly, if you said that you were like everyone, rather than everyone was like you.

P: I am so smart. Everyone should be like me.

E: Well, Silly, you still haven't shown me your right hand. Do you know where your right hand is?

P: It's at the end of my arm..ha..ha..that was funny wasn't it? (Puppet looked at the E who gave him a very serious look) Let me see now. I know. (Puppet raised his right hand) Here it is. Here it is (waved it at the E). I am so smart.

E: Well what do you think? Is that Silly's right hand? Why? That was very good Silly. Now can you show me your left hand?

P: I have a left hand too? Let me think. I know. here it is. Here it is. (Puppet waved his left hand at the E).

E: Who can tell me if Silly is correct? Is that Silly's left hand? Why?

P: See, I told you I was smart.

E: Well, Silly, so far so good. Now I am going to ask you to show me someone elses right hand. Who would like to come and let Silly find their right hand?

P: Oh, that is going to be as easy as pie.

E: Well, Silly. (The E turned to the Ss, and put her hand beside her mouth as if concealing the conversation from Silly) Silly doesn't know it yet but he's in for a big surprise. This isn't as easy as it looks.

P: Dumdeedum..I am so smart. Here is my left hand (raised it) and here is my right hand (raised it). This is going to be easy.

E: All right Silly, you will have a chance to show how smart you are. ___(name) said he would like to play. I want you to tell me which hand is ___'s right hand. ___you stand here in front of Silly. I will cover Silly's eyes while you show everyone your right hand. Is that his right hand? Why? Now I will put something in your hand (E placed a piece of red felt in the Ss right hand). Close your hand tight. Close your left hand tight too. Now Silly, I will uncover your eyes. Now I want you to tell us, Silly, what hand is ___'s right hand."

P: Can I do it now? I know. I know.

E: Just a minute, Silly. First let me tell you what will happen if you are correct. If you pick the correct hand, when ____ opens up his hand you should see a piece of red felt.

P: Oh, red felt. Red felt. My favourite. I love red felt.

E: Wait a minute, Silly. If you are wrong, ___will open his hand and nothing will be there.

P: Oh no.

E: All right Silly. Now, remember, show me ___'s right hand.

P: This is so easy. Let's see now. This is my left hand (raised it) and this is my right hand (lowered the left and raised the right). So then, ___'s right hand should be in the same place as my right hand. Here's ___'s right hand (grabbed it in both arms). I've got it. Open

it up and let me see the red felt. Let me see it.

E: Before ___ opens his hand that Silly chose, who can tell me if he chose the correct hand? Why? O.K. now you can open your hand.

P: You tricked me. You ate it.

E: No Silly. _____ open up your right hand. See, there is the red felt. You made a mistake. You picked the left hand.

P: But I thought everyone's left and right were the same.

E: Well, that's true.

P: And I picked his hand that was on the same side as mine.

E: Who can tell Silly what is wrong with the way he chose ___'s right hand? How is ___standing? What happens when someone is facing you? That's right. When someone is facing you, their right and left hands are on opposite sides.

P: You mean, when you're not looking, your left hand jumps over to the right side and your right hand jumps over to the left side?

E: No, Silly. Are you ever Silly. When you turn, your left and right hands turn with you. You will see what I mean. Who would like to try next? (The first S returned to his place on the floor.) Now, ____, I would like you to stand beside Silly. (S stood to the right) ___ is standing to the..right of Silly. Now I want you to be facing the same way as Silly. I am going to put a piece of red felt in _____'s right hand. Now all you have to do is find her right hand and you will get the felt. Now close your eyes.

P: (to the Ss) Ha. She thinks she is going to trick me again. Let's see. Last time I picked the opposite, or I should have picked the opposite but I picked the same. Now I will pick the opposite, since that was correct last time. I will get the felt.

(to the E) Well, let's see. Here is my left hand (raised it) and here is my left hand. Now you think I am going to say it is this one (touched the S's right hand), but, I am smarter than you think. Since this is my right hand, ____'s right hand will be on the opposite side. This is the right hand (grabbed it) and I know where the felt is.

E: Before ___opens the hand that Silly chose, can anyone tell me if Silly is correct or wrong. Did Silly choose ___'s right hand? Why? Let's find out.

P: Open your hand and let me see the felt. What happened?

E: Open your right hand and show Silly the felt.

P: I just don't understand.

E: Can anyone explain to Silly what happens when someone is standing beside you? Can anyone tell Silly where left and right are when someone is facing you? You see Silly, everyone has a left and right. Your left hand is called left, because it is on the left side of your body.

P: And right hands are called right because they are on the right side of your body.

E: Now when someone is standing beside you and you are both facing the same way, then you are standing the..same. And your left and right hands are the..same. (E waited for the

Ss to respond.) Now, you and ___ are standing...the same. Why? That's right because you are both facing the same way. You are both looking the same way. Now ____ raise your right hand. Now, Silly, you raise yours. See they are the same. Now, ___ slowly turn around with your right hand in the air. What happens? That's right. Her right hand turns with her. Now where will ___'s right hand be? Why? Where will ___'s left hand be? Why? ____'s right hand and your right hands will be on the..same side. Why? _____'s right and Silly's right hand will be on...different sides. Why?

P: Now I know. Now I know. When you are standing the same your hands are the same. And when you are standing different, left and right are different too.

E: Very good. One more chance Silly. Who would like to be next? ____, I would like you to stand behind Silly, so that you see his back. ____(S_2) I would like you to stand in front of Silly so that he sees your back. Now, I will give each of you a piece of red felt for your right hands. Now, Silly, the piece of red felt is in each of the boys' right hands. First of all, will the right hands be the same? Will they be on the same side? Who can tell me? Why? O.K. Silly will their right hands be on the same side as yours? Who can tell Silly the answer? Why?

P: Let's see now. Are we standing the same? I'd say yes.

E: Why would you say yes.

P: We are standing the same because we are all looking the same way.

E: Good. Now, will your left side and right side be the same? Who can tell Silly? Why?

P: They will be the same. They will. (Silly took the felt.)

E: Now each of you will have a chance to try and fool Silly. When you come up to the front, stand either facing, or with your back to Silly and see if he can find your left or right hand. (Each S came to the front and the E asked Silly to chose the left or right hand. The E asked the remaining Ss if the choice was correct or incorrect. The S revealed the hand with the felt, if Silly was correct or without the felt, if incorrect. Silly just grabbed the felt, if correct or sulked if incorrect i.e., no dialogue with the puppet during this part of the lesson. Towards the end, Silly made all the correct answers.)

E: Well, that was very good, Silly. It looks like you really did learn a lot from the boys and girls.

P: I guess I wasn't as smart as I thought I was. But it was fun to learn about left and right. I enjoyed playing with the boys and girls.

E: Well, Silly, it's time to go. Say good-bye to the boys and girls.

P: Good-bye. (Silly went into the dog house.)

The E thanked the boys and girls for helping Silly.

Session 6

Lesson #9

The E welcomed the Ss and positioned them in a straight

line, such that all the Ss were facing the E. "Now I want you to stand like this (in a straight line). We are going to play a game today called Simon says. Now, I am going to face you and say things like; "Simon says put your hands on your head." I want you to do what Simon says. After I am Simon for a while, then I will let each of you be Simon for a while. If you don't do what Simon says, then you have to sit down. If you make a mistake, then you have to sit down until everyone has made a mistake and we will begin again."

"I will be Simon first. Simon says put your hands on your head. Simon says put your left hand in the air." The E asked all the Ss if everyone's left hand was up. "Now we will begin. That was just practice." The E called out directions, and asked for the Ss to watch that everyone was correct. After each instruction, the E said; "Is everyone doing what I asked? The E continued until all Ss were seated. Examples of some of the directions that were given are: "Simon says put your hands on your feet. Simon says put your hands in the air. Simon says put your left foot up, etc." The E discontinued asking questions when all the Ss were seated and at that time allowed each S to give four directions as Simon. Between each Ss turn at playing Simon, the E acted as Simon, continuing to increase in difficulty the directions she gave.

After each child had been given at least two opportunities to play Simon, the E stood with her back to the Ss and repeated the directions she had given previously for the front position.

The E thanked the Ss for playing and said that they all

made very good Simons. The E said that she was looking forward to seeing them at their next meeting.

Session 7

Lesson #10 (review)

The E welcomed the Ss and arranged them so that the Ss were seated in a semi-circle on the floor. The E brought out the felt board used previously.

"Remember the felt board? We are going to put some pictures on the board like we did last time. Here is a picture of a ball. I will put the ball here (centre of the board). Now who would like to put the bird on the board? I would like you to put the picture of the bird to the left of the ball." After each placement, the E asked all the Ss if they agreed or disagreed with the placement and why. The E asked questions after each placement, such that the questions were cumulative in nature. The E repeated the procedure for the dog which was to be placed to the right of the ball.

When the three items had been properly placed and the appropriate questions asked, the E inserted the pictures of the boy and girl such that the boy was facing the Ss and the girl had her back to the Ss. The boy and girl were facing each other, with the stimulus items between. The E asked an S to pick the item that was to the left of the ball for the girl. The E asked another S to pick the item that was to the left of the ball for the boy. The E repeated this procedure (The E asked the Ss if they agreed or disagreed with each placement and why they felt the response was correct or

incorrect.) until each item had been named and its relationship to the boy and girl established.

The E removed the pictures and placed three new pictures on the board. The tree was situated at the top of the felt board. The house was placed in the middle and the cat, at the bottom of the board, such that the pictures were placed vertically, one underneath the other. The E then placed the right profile of the girl to the left of the items and the left profile of the boy to the right of the items. Each S was required to come to the board and point, naming the item required. For example, the first question was; "Come to the board and show me what the girl would see on her left (tree)." "Show me the picture the boy would see on his left (cat). Corrections were made as outlined previously. For example, if the S pointed to the cat instead of the tree when asked to point to "what the girl would see on her left", the E would ask the Ss ; "Who agrees with ___'s answer? How many think that the cat is on the left? Who thinks that the tree is on the left? Why is the tree on the left?, etc." Questions were initiated by the E after each placement.

After the questions were completed for all the items on the board, the E removed the stimulus items and placed two sets of pictures that were identical on the felt board. Two of each of the following: apple, star, bird, house, dress were placed on the board such that each set of items constituted a cross formation. On the first (left side) set, the apple was situated at the top, star in the middle, and bird

at the bottom. The house was on the left side (opposite the bird) with the dress on the right (opposite the house). The second set had the same formation with the exception that the house and the dress were reversed. The Ss were asked what was different about these pictures. The relationships of the other objects was also questioned.

The second set of pictures (two of each of a flower, ball, shovel, banana, boat) were also placed in the cross formation. One set (left) had the flower at the top and the shovel at the bottom of the vertical line, while the second set revealed the reverse (flower at the bottom and shovel at the top). The E followed the same procedure as above.

For each of the above formations, the E generated questions concerning the positional relation of the items to each other.

After the E had initiated all relevant questions, the stimulus materials and the felt board were replaced by the next items. The E introduced the new stimulus material (7 cards) saying; "Now I have some pictures to show you. (The E presented the cards in the same manner as noted in Lessons 1-3 with the exception being that the Language Master was not part of the lesson. Rather than have the machine play a recorded statement to correspond with the concept illustration, the E provided various statements concerning the pictures on each card. The statements were similar to those seen previously as E initiated questions in preceding lessons. For example, when the E exposed the

first card which had three items in a row horizontally (a dog on the left, a ball in the middle and a bone at the right), she did so by saying; "The ball is to the left of the.." and waited for the response "bone". Since the Ss were familiar with the questioning procedure, responses were given immediately and the partial statements were completed by the Ss. Additional E initiated statements for the first card were; "The dog is to the left of the..ball. The dog is also to the left of the..bone. The bone is to the right of the..ball. The bone is also to the right of the.. dog. The ball is to the left of..the bone. The ball is to the right of the..dog. How can the ball be to the left of the dog and the right of the bone? Why are the dog and ball to the left of the bone? Why are the ball and the bone to the right of the dog?"

The E followed the above procedure initiating statements concerning all possible relations depicted on each card. Corrections were made for all statements in the same manner outlined previously (Ss were asked if they agreed or disagreed with the answers and why.). An additional six cards constituted the remainder of the lesson. The cards were presented in the following order, and revealed illustrations of: a girl with left profile and three vertical items- a doll, ice cream cone and bracelet; a boy, right profile and three vertical items, a car, dog and flag; a boy facing three horizontal items, car, dog and flag; a boy left profile facing three vertical items, a car dog and

flag; a boy with his back to the Ss, facing three horizontal pictures of a card, dog and flag.

Once all the cards had been presented and all possible statements made and corrected concerning the interrelationships illustrated on the cards, the lesson was complete. The E then thanked the Ss very much for helping her play all the games so well. She also said that they wouldn't be playing anymore games together, but that she would come and see them all in a little while and play a game alone with them.

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